

We claim:

- 1 1. A semiconductor laser device including:
 - 2 (a) a first oxide layer defining a first aperture;
 - 3 (b) a second oxide layer defining a second aperture; and
 - 4 (c) an active region located between the apertures;
- 5 the apertures being of sizes and distances from a center of the active region to induce
- 6 a near-Gaussian shape of spatial current density distribution.
- 1 2. The laser device according to claim 1, having a p-mirror on one side of the
- 2 active region and an n-mirror on another side of the active region, and wherein the first oxide
- 3 layer is p-mirror oxide layer and the second oxide layer is an n-mirror oxide layer.
- 1 3. The laser device according to claim 2, wherein the first and second oxide
- 2 layers and the first and second apertures defined differ in distance from the center of the
- 3 active region.
- 1 4. The laser device according to claim 2, wherein the size of the first aperture is
- 2 smaller than the size of the second aperture.
- 1 5. The laser device according to claim 3, wherein the size of the first aperture is
- 2 smaller than the size of the second aperture.
- 1 6. The laser device according to claim 3, wherein each of the mirrors comprise
- 2 stacks of mirror pairs, the first aperture is spaced at substantially three to twenty mirror pairs
- 3 from the active region and the second aperture is spaced at substantially one to four mirror
- 4 pairs from the active region.
- 1 7. The laser device according to claim 4, wherein each of the mirrors comprises
- 2 stacks of mirror pairs, the first aperture is spaced at substantially three to twenty mirror pairs
- 3 from the active region and the second aperture is spaced at substantially one to four mirror
- 4 pairs from the active region.
- 1 8. The laser device according to claim 3, wherein the first aperture is
- 2 substantially 3 to 20 μ m across and the second aperture is substantially 5 to 30 μ m across.

1 9. The laser device according to claim 4, wherein the first aperture is
2 substantially 3 to 20 μ m across and the second aperture is substantially 5 to 30 μ m across.

3 10. The laser device according to claim 7, wherein the first aperture is
4 substantially 3 to 20 μ m across and the second aperture is substantially 5 to 30 μ m across.

1 11. In a VCSEL having an active region, a first stack of mirror pairs on one side
2 of the active region and a second stack of mirror pairs on a second side of the active region;
3 the improvement comprising a first oxide aperture of a first size on the one side of the active
4 region at a first distance from a center of the active region and a second oxide aperture of a
5 second size on the second side of the active region at a second distance from the center of the
6 active region.

1 12. The VCSEL according to claim 11, wherein the first aperture size differs from
2 the second aperture size and the first distance differs from the second distance.

1 13. The VCSEL according to claim 12, wherein the first aperture size is smaller
2 than the second aperture size and the first distance is greater than the second distance.

1 14. The VCSEL according to claim 13, wherein the first aperture size is
2 substantially 5 to 30 μ m across, the first distance is substantially 3 to 20 mirror pairs along the
3 first mirror pair stack and the second distance is substantially one to four mirror pairs along
4 the second mirror stack.

1 15. The VCSEL according to claim 11, further including a substrate upon which
2 the active region and first and second mirror stacks are grown, a via into the substrate and
3 into proximity with one of said mirror stacks, heat conductive plating extending from an
4 outer surface into the via.

1 16. The VCSEL according to claim 14, further including a substrate upon which
2 the active region and first and second mirror stacks are grown, a via into the substrate and
3 into proximity with one of said mirror stacks, heat conductive plating extending from an
4 outer surface into the via.

1 17. The VCSEL according to claim 11, further comprising a heat sink supporting
2 the active region and the first and second mirror stacks, said heat sink extending into heat
3 conducting relation to one of the mirror stacks.

1 18. The VCSEL according to claim 13, further comprising a heat sink supporting
2 the active region and the first and second mirror stacks, said heat sink extending into heat
3 conducting relation to one of the mirror stacks.